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THE PULSE OF LIFE

ON various occasions[1] I have expressed the opinion that life and mind must be defined in terms of behavior whether observed or expected. The reasons that led me to this conclusion have been set forth at sufficient length,—they all come back to this one: that to assert the existence or non-existence of any thing is meaningless unless we can verify the assertion, but experience is the only means of verifying assertions, and behavior the only aspect of the beings we call living or conscious which is matter of experience. Hence in our empirical reasons for calling one thing alive, another not, one thing conscious, another unconscious, must lie the meaning of life and mind.

I had not thought to return to this matter whose interest for me lay rather in what it led up to[3] than in its own modest content. But I have come to see that one can not define a method without illustrating it, unless one is willing to be widely misunderstood. I have had sufficient occasion to realize this, for the thesis which seemed to me so much a matter of course has been regarded by many as revolutionary,[3] not to say "*waghalsig,*"[4] and a way of looking at things which I should have called Aristotelian has been interpreted as "materialistic."[5]

The fault, of course, is my own. I have confined myself to showing why life and mind *must* be defined by a certain method, and have offered no reply to those who ask,—But how can they be? I have pointed to behavior as that in terms of which life and mind must be set forth, but I have not answered the question,—What behavior? One might well enough remind me that "*Kein tolleres Versehen kann sein, Gebt Einem ein Fest und läd ihn nicht ein.*"

To mend all this there is but one way, and that is to sketch in a

1 This JOURNAL, Vol. VIII., page 180; Vol. IX., page 15 and page 206.
2 *Ibid.*, "Man and Fellow Man," Vol. X., page 141.
3 Miller, *ibid.*, Vol. VIII., page 322.
4 Jacoby, *Internationale Monatsschrift.* Jg. 8, No. 1, page 7.
5 Montague, "The New Realism," page 271.

picture of the world as it appears to one who has come to look upon life and mind as behavior. Such a picture can not be presented with any confidence that its details are correctly drawn; as one hand moves the pencil the other is ready with the eraser. But as an illustration of method the whole imperfect thing has its interest, and while in my impatience to get on to the consequences of a theory I faced the task of illustrating it as an unwelcome interruption, I have nevertheless experienced in the working out no little enjoyment.

But in this first paper I shall attempt no more than a picture in which *life* appears—the concept of *mind* shall be for another time.

Life and Mechanism

As the medium in which the image of life is to be wrought, let me assume the world of mechanism. When I conceive such a world, I spread it out in space and attach to each of its points a limited number of characteristics or parameters which I then connect by such formulas as enable me to express their values as functions of a single variable, *time*. To construct such an image of the world we live in is the ideal of physical science. It is only an ideal, and to have chosen it as a medium in which to work means no more than to have registered a pious intent to introduce no definition of life or mind which shall stop our approach to the mechanical ideal. Those whom the history of physical science inspires with no such respect for its ideal as to require them to conform their notions of life to it will care little for an image worked out in a medium they reject. Their quarrel with me is serious enough; but this is not the moment to enter on it nor a suitable *terrain*. It can be only for such as regard the mechanical ideal as inviolable that the problem of defining life consistently with it is a real problem.

But for such the problem is very real, for every one knows how difficult it is to pass from an image of the world as mechanism to an understanding of that same world as the medium not only in which, but also of which life has its being. The difficulty which this transition offers to thought has sometimes been taken for a very hiatus in the order of nature, a chasm and an abyss so threatening to the continuity—not to say the consistency—of our thought that the most extraordinary philosophies have been built to bridge it. The most notorious of these inventions are (1) that which attempts to make life consistent with mechanism by making life mechanical, (2) that which tries to make mechanism consistent with life by making mechanism alive at every point. The first, I think,[6] may fairly be

[6] I say "I think," for since I find that I have myself been called a "panhylist," which must be an aggravated variety of materialist, I am not sure that I know what idea, if any, the term materialist conveys. If every one is a ma-

called a *materialistic,* the second a *monadistic* account of the relation of life to mechanism.

For one who confines himself to determining what behavior on the part of certain objects of our experience makes us call them living, and who then defines life as that which is common to the behavior of living things, neither materialism nor monadism is possible; but neither for such an one does the gap exist for whose bridging these philosophies have been invented. He makes it his problem so to define life that it may dwell in mechanism and be of it, but in such manner that neither shall life be turned into mechanism nor mechanism into life.

Materialism

In framing such a definition of life we shall be in accord with very old tradition if we consider that a certain purpose is revealed in the behavior of the beings we call living, and that it is because of this purposive behavior we call them so. But to erect this purpose into a definition of life is to enter at once on the troubled domain of teleological definition.

The confusion that usually attends upon this method of defining comes, I think, from our failure to keep distinct the two classes into which a single individual may fall when one of these classes is defined without reference to purpose; the other connotes nothing but a sameness of purpose. The distinction is obvious enough when our thought is not troubled by the application of both methods of classifying to the same system. The classes "triangle," "gravitational system," "salt" suggest nothing of a common purpose served by triangles, or by gravitational systems, or by salts. A triangle *must be* three-sided and plane, it *may be* the best form for a spear-head, for an element of a bridge truss, for a certain fashion of musical instrument. Neither is any one purpose served by gravitational systems, nor have salts a unique function. The definition of these geometrical, physical, and chemical concepts is ateleological and the sciences dealing with terms so defined might be called *ateleological* sciences. On the other hand, the classes "musical instrument," "time-piece," "seasoning," connote nothing of the geometry, physics, or chemistry of the objects contained in them. A musical instrument *must be* capable of producing pleasant tones, it *may have* the structure of a triangle, or of a fiddle, or of a flute. So "time-pieces" may vary in mechanism from a sun-dial to a chronoscope, and to make its proper appeal the

terialist who refuses to look upon the contours of a living being as the boundary of a region in which the kind of predictability that holds outside of it breaks down, then I am a materialist along with Spinoza and Kant. If, on the other hand, a materialist is one who attempts to give a mechanical definition of life, then, unlike Democritus, or Lamettrie, I am no materialist.

"seasoning" may call for salt or it may call for pepper. If, then, there is any group of sciences whose peculiar and specific concepts are defined in terms of purpose and place no limit on the variety of mechanisms which may be found to serve this purpose, we might call such sciences *teleological*. It is in this group we should place biology, if that life of which biology is the study is properly defined in terms of purpose alone.

No one would be tempted to confuse these two *principia divisionis* if it were not for the puzzling way in which the classes they denote intersect and overlap. For example, that portion of the extended world which is at this moment bounded by the surface of my body is part of the universal mechanism, and is more or less like other parts in its mechanical structure. Hence it belongs to a class of mechanisms, ateleologically defined. Am I not, then, a machine? On the other hand, the history of my body's behavior reveals a purpose running through its various acts, a purpose quite like that which characterizes my neighbor, my dog, the moth that flutters by me. Am I not then a being with a purpose? And one may repeat this question apropos of every member of the class "living-being": it is a member of that class because its behavior reveals purpose; it has at each moment membership in another class defined without reference to purpose. Which is it, *really*, a thing of purpose or a mechanism?

But the question answers itself and I introduce it merely to point out the part it plays in the psychology of materialism. For materialism is nothing but an attempt to define life in terms of mechanism. It observes correctly enough that each living thing has at each moment a place in a class of mechanisms: it fails to observe how endlessly unlike these classes may be and seeks to state what is common to them as the definition of life. But there is nothing in the way of mechanism common to all that is or might be called living, and the living would never be put into a single class were they not moments in a scheme of purpose: the class living-being has nothing but a certain purpose common to its members and only this purpose can be offered as the definition of life. It is for this reason that as living I am classed with the grass of the field: as mechanism I am much more like my own corpse.

Monadism

If the definition of life as a certain kind of purposeful behavior makes materialism impossible, it makes "monadism" or "hylozoism" no less so. For implicit in the concept of purpose is that of freedom, and freedom is exactly that which we have denied to the points of our mechanical system. At the point there can be no freedom, no purpose, no life.

That freedom is implicit in our definition of life may be made to appear by either of two comparisons. If we follow the history of any individual living thing we observe through what varying mechanical vicissitudes (of light, heat, chemism) it works out its purpose. "adapting itself" as we say to a wider or narrower range of circumstance. Or if we compare, not the same individual at different moments, but the most resemblant individuals at the same moment, we may measure their adaptability in terms of the range of mechanical situations that leaves their purpose as living beings undefeated. But to accomplish the same defining purpose in a variety of mechanical situations is to be independent of mechanism to a degree measured by the range of things that "do not matter."

The invariance of purpose in a variety of mechanical situations is freedom. We do not first find life and then speculate as to the freedom of living beings; it is not until we have found this freedom that we are sure of having found life.[7]

It is clear then that in a system whose points are assumed to be mechanically connected we can not posit life in all its freedom at the point. The only remaining possibility is to regard life as a phenomenon of the *group of points.* But how are we to effect a grouping of mechanically determined points so that the group shall be free when the points are not? How can a kind of grouping introduce freedom into a system whose elements are not free?

Theory of the "Pulse"

The relation of whole to part is no one relation, but presents an infinite variety. The simplest type is that in which the whole is said to be equal to the sum of its parts, and because of the ease and familiarity of the operation of adding we are only too willing to think of all grouping as summation and to apply to it the principles of arithmetic. As a matter of fact the examples which our experience offers us of what might be called additive groups are rare: we think of a foot as the sum of the inches which compose it, of a pound as the sum of the ounces contained in it; but we should not get very far if we tried to think of a chemical molecule as the sum of its atoms, and we should go much too far if we insisted upon defining a state as the sum of its citizens. At the outset, then, it is well to protect oneself against a natural tendency to apply axioms of addition to all forms of composition. Can it be less absurd to say, The whole being

[7] Curiously enough the attention of those who discuss "freedom" has been centered on the possibility of doing different things under the same circumstances. This is not freedom, but caprice. Our freedom is measured by our ability to do the same thing under different circumstances: it is that *independence of circumstance* which Stoic and Epicurean understood so well.

equal to the sum of its parts, if there is no freedom in the part there can be none in the whole, than to say, A triangle being composed of straight lines, if there is no triangularity about each of these lines there can be none in their combination?

Now of all the ways of composing a whole out of parts there is none which holds more surprises in store for the arithmetical soul than that which permits us to regard a wave moving through a medium as made up of the parts of that medium itself; for in no other form of composition is the non-additive character of the grouping more obvious, in none other is the contradiction between the properties of the group and the properties of the elements grouped more keenly felt. Through a medium whose parts are moving up and down, a pulse composed of these very parts may move horizontally; through a medium whose parts are moving back and forth about a center of equilibrium, a pulse may pass on and on. If we have overcome the primitive instinct to add, if the peculiarities of wave-composition no longer surprise us, there can be nothing to shock us in the further suggestion that through a medium of mechanism all of whose points are determined, a pulse of life may pass freely on its way.

Following this suggestion our method of defining life, though it insists upon the distinction between mechanism and life, denies the chasm between them. For imagine that through the infinite sea of mechanism already defined, there move certain wave-like forms, not indeed wind-tossed, but rather purpose-drawn; and imagine the purpose in terms of which the behavior of these forms could be explained and predicted to be that of *self-preservation;* would not each of these pulses correspond in all respects to what we call a living thing? Is it not as such a pulse that each thing which lives moves slowly on through the vast sea of mechanism drawn this way and that, not as the waves of the ocean are blown, but as "the lover is moved by the loved object"—until breaking upon some sudden obstacle or dying out in the viscous medium it is seen no more? But between such a pulse of life and the universal mechanism in which it arises, through which it purposefully moves awhile and into which it passes away again, there is no discontinuity or break. A new thing has indeed appeared, a new thing that is not to be defined or studied by the methods of mechanics: this new thing is a *group;* a group which is in the nature of a *pulse;* a pulse whose behavior may be defined in terms of *purpose;* a purpose which we recognize to be that of *self-preservation* requiring adjustment and adaptation to the various mechanical situations through which in the course of its history the pulse freely passes. This new thing is *life.*

The Science of Life

But if life can not be mechanically defined, if living behavior can not be mechanically explained or predicted, in what sense can there be a science of life? What must be the nature of the laws of such a science and on what sort of calculations can it enter?

The answer to these questions must depend upon our understanding of the term "purpose," which has entered into our definition of life and so must control our treatment of living phenomena. I take it that the accomplished purpose of an act will always be sought among the results of that act. No doubt the chick yonder embodies the purpose for which a certain egg was laid: it is also a result of that laying. But if we were to follow all the results of that laying, a humble barnyard episode would turn into a cosmic event on our hands. For that egg in falling has jarred the universe, and one wonders why out of its endless consequences just this unimpressive chick should have been taken as the one for whose sake the event befell. What is it that distinguishes the result that is a purpose from the infinity of other consequences that are merely accidental?

I know that it is usual to define purpose as the *desired* result and to accommodate this definition as best one may to the purposeful acts of the humbler order of beings; to the tree whose blossoming must express some one's or some thing's desire for another tree of the same kind, to the unicellular organism whose ingesting of a foreign body must betray its hunger. But in order that the concept of desire may have so wide an extension, must we not have made its meaning identical with that of purpose? Must we not have offered a tautology in place of a definition? Or else we may have done worse than this. We may have made of desire some immediate experience of which we believe ourselves in possession, but of which we can give no account or description; we may then have trusted to luck in assuming that others would understand us when we used this term; we may finally have appealed to analogy to justify the hypothesis that all things acting purposefully have a like subjective experience. The emptiness of each phrase that sets forth the process by which I am supposed to read my own inarticulate experiences into others has been sufficiently insisted upon elsewhere.[8] It will be enough to point out at this time that no one could verify the "hypothesis" of desire in fellow-man, fowl, shrub, or amoeba. How then could one make use of these unknown desires to distinguish the known purpose of an act from its accidental results?

No, the definition of purpose can gain nothing by an appeal to desire as that which can be established first in the study of any given act and then used to distinguish the purpose of that act from

[8] This JOURNAL, Vol. VIII., page 180.

its accidental consequences. Such an appeal does indeed suggest that the distinction between the purpose and the accidental results of a given act requires us to collect other data than those furnished by the mechanical description of that act and its consequences. But these data can only be collected if they are as observable as the act itself. And what can be as observable as the act except *another* act that is like it? Here then we have our suggestion. If but once in the known history of the universe an egg were laid, a blossom burst, a morsel were ingested, would there be any possibility of our recognizing among the consequences of each unique event one that was its purpose? Or if the same sort of event happened many times, but among the consequences none were found to be common to the various cases, would we then be able to recognize a purpose in that type of event? But if, on the other hand, the type of event happened frequently enough to enable us to compare the spheres of consequence that emanated from each case as from an origin, and if we found that in a certain proportion of cases the same kind of result followed, would we not be justified in looking upon this *average common result* as *the purpose of the act,* assigning the remaining variable consequences to accident?

Purpose then may be defined as the average common result of a type of act. As an average result it is not expected to follow "always" but only as Aristotle would say "for the most part." Or rather, this classic expression is still too vigorous. For we recognize a result as a purpose when it is common to but a very small percentage of the cases falling within the type of act whose purpose it is. The purpose of the depositing of each shad's egg is no doubt the production of another shad, but it would be unfortunate for the rest of us if this result followed for the most part on the event. In place of the loose Aristotelian phrase we should substitute an exact mathematical expression, one that is based on an empirical study of statistics and presents itself finally as a *measured probability.* We may say then that the purpose of an event is the result which that type of event is *calculated* to accomplish; the calculus in question having for its data statistics and for its method the theory of probabilities.

A teleological science has for its laws the statistical principles which we call rules, but to contrast it for this reason with the "exact" sciences is inexact. For though from the very nature of the concepts which it employs a teleological science must deal with principles that apply to the individuals of a group *collectively,* and not *distributively,* there is no limit to the exactness with which these laws can be expressed. If we are interested in applying its results to an individual of a group it has studied, it can only offer us mate-

rial for a calculus of what this individual will probably do, but it can give to this probability as exact an expression as it chooses.

There is then a science of life; it is an exact science of the probable in the domain of self-preservative behavior.

"Self-Preservation" Defined

It requires, I suppose, no special defense that we have taken only one of the purposes revealed in the behavior of living beings as the *defining* purpose. Any self-preservative being may belong to a number of other teleological classes—the type-preservative for example. In general the possession of one "nature" by a given individual does not exclude the possession of a different and even contradictory nature, for from what has already been said respecting the meaning of teleological classification, it will appear that the behavior which justifies us in assigning an individual to a given class may be and generally is only part of its total behavior. It will not surprise us then if self-preservative beings are also type-preservative and if at moments their type-preservative acts are self-destructive. In framing our definition we have included in it only the minimal connotation that would give to the class defined the denotation which has been traditionally accorded to the term life and which we are prepared to preserve for future use. It is sufficient for us that no finite being devoid of self-preservative behavior has been called living, and that we are prepared to recognize as living a being, however constructed, however devoid of other purposes or natures, if only it reveal self-preservative behavior.

But is this concept of self-preservation itself so clear and well defined that it may profitably serve for the defining of other terms?—I confess that I am not of those who move with ease and enjoyment through the domain of the reflexive categories. Even this most familiar one of self-preservation gives me pause. To preserve one's fortune, to preserve one's reputation, these expressions are intelligible enough because the preserver and the thing preserved are sufficiently marked off the one from the other to permit of a relation being set up between them. But when the preserver and the preserved are as closely identified as one is with oneself, it is with no gaiety of heart that I approach the task of so mixing "the same" with "the other" as to constitute the concept of self-preservation.

However, there comes to my mind the couplet into which a certain weary soul put the whole story of his life as it appeared to him in retrospect. "I ate," he said,

> "I ate, drank, slept, and then,
> I ate, drank, and slept again."

Now whatever of the richness and variety that sometimes pertain to the lives of men this unimpressed person had managed to miss or to forget, he had not been able to leave untold a certain minimum which is the content of life itself. And this minimum seemed to him to consist in a precarious sort of *againness* whose monotonous rhythm had filled his years. If one had asked him why he had thus eaten, he would have said, I fancy, in order that he might eat *again*. In the same sense that the fowl lays an egg in order to produce another fowl, our hero ate his dinner in order that he might eat another dinner. A being who so acts that the repetition of his act is well calculated to result from it, whose act is seen to be a means of ensuring its recurrence, is a self-preservative being.

Such, at least, is the simplest life definable; but our hero's was relatively complex: he not only ate, but he also drank and slept. We should doubtless be too additive in our methods if we represented him as doing each of these things for the purpose of doing just that thing again. Did he not do each in order that he might do all three again? A in order that he might do A, B, C . . . in the future, B, for the same reason, and C, with a like motive . . . ? A being whose acts may be analyzed into n types such that each type has for its purpose the repetition of all n types is not only a living being, but also an organism. I dare say we can find no example of a living being which is not also an organism, so that the terms living being and organism have come to be used interchangeably, but the meaning of organism contains more than the definition of life.

Thus we have our concept of organized self-preservation. The sameness implied in it is the sameness of the wave as a whole, the otherness the rhythm of its complex and changing contour as it is transmitted by and translated through the medium in which and of which it is.

Concerning Death

With this definition of self-preservative behavior, the picture of life and its relation to mechanism are complete. Yet it may be a matter of surprise to some that we have included in our definition of life no reference to the episode of death, so universal as to be commonly regarded as a part of life itself. Even Professor Schaffer, who startled an over-excitable if not over-imaginative world by accepting the possibility of a laboratory creation of life, was unable to stretch his thought to the point of conceiving a laboratory prevention of death.[10] But if one has gone so far as to exclude from one's conception of living things all reference to their way of coming into being, it would seem natural that one should include in one's definition no reference to their manner of passing away again. The *pos-*

[10] *Science*, N. S., 36, 289.

sibility of creating life and the *possibility* of eliminating death mean no more than that we may define life without reference to its beginning or end. Whether we can find or produce beings that fall within this definition and *also* meet certain conditions of beginning and ending is a purely empirical question, the ground of whose answering lies quite outside of the definition.

Birth and death then are only synthetically attached to life, but while the motive for reading birth into the definition of life is no deeper than an habitual association of ideas, I am not sure that the insistence on death as a thing whose germ lies in birth is to be explained in the same way. For we have seen that the teleological method of defining which gives us our concept of life is essentially statistical and looks upon the future of each thing in a class as a matter of probability. In order that there should be nothing more than probability, there must be a possibility that the future expected should not arrive: there must then be cases in which it does not. But the defeat of the purpose of the living being is death, and so its occurrence would seem to be essential to the meaning of life. It will be remarked, however, that this necessity of death is but a requirement that some die, not that all die. Death is an essential phenomenon of a group taken collectively, not of that group taken distributively. As for any individual, it is enough that for him life is not certain, nothing requires us to maintain that death is.

So I have defined life without reference to its beginning or its end; I have also defined it without reference to its higher and lower forms. It is possible to do this because so far as life goes the existence of the higher form is not involved in the meaning of the lower, and conversely. Where, however, these differences of higher and lower life exist it is possible to introduce a new category to describe their relations. This new category is *mind*.

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A DEFINITION OF CAUSATION: A REPLY TO PROFESSOR SHELDON

PROFESSOR SHELDON, in an interesting series of four articles recently contributed to this JOURNAL,[1] draws attention to a new definition of causation. His results may be summarized as threefold:[2] (1) that two types of causation clearly emerge, "a certain serial type called a self-repeater, and one of composition"; (2) that "the

[1] Volume XI., pages 197, 253, 309, 365.

[2] Vol. XI., page 365.

cause is *two* terms'' and not ''*one term alone*, where Hume and his successors always looked for it''; and, (3) ''that there is a *necessity* in the existent world.'' I shall direct attention to (2) and (3) only. The reason for the restriction lies in the mere desire to narrow the issue. I wish also to state in advance that I do not take issue with the *conclusions* advanced in (2) and (3), but with the argument offered in their support.

That ''the cause is *two* terms'' and not ''one term alone,'' is a correction of ''Hume and his successors'' that easily welcomes an emphatic approval. On this point, as in so many others, Hume's displacement of Locke in general esteem has proved a detriment to subsequent tradition. Thus Locke, unlike Hume, and in part coincident with the results reached by Professor Sheldon, emphasized (1) the duality of our cause; (2) a necessity existent in ''the constant and regular order'' of things, together with a necessity that the causal situation more directly inspires; and (3) an element which Professor Sheldon omits adequately to note and incorporate; namely, the presence of *change*. I must touch somewhat upon each of these points in Locke before I turn to Professor Sheldon's results.

Locke writes: ''There must always in relation be two ideas or things, either in themselves really separate, or considered as distinct, and then a ground or occasion for comparison.''[3] He thinks this duality of terms to be true of ''relations'' in general. The causal relation with him differentiates itself from other relations in the fact that ''the ground or occasion for comparison'' in causation is change. Thus we read: ''wherever change is observed the mind must collect a power somewhere able to make that change, as well as a possibility in the thing itself to receive it.''[4] It is with an emergence of change, then, in one or more of the initial terms that Locke would seem to find the first moment in an analysis of causation. It follows by natural consequence that, in the emergence of change, we also have the essential differentia of a causal from a non-causal situation.

The term ''power,'' however, in the above citation, carries an objectionable meaning and tradition. We, with Hume, have come to reject it. But, in justice to Locke, let us remember that he, too, rejected it quite as forcibly as did Hume. The contention Locke reiterates without end assumes a form not unlike that reached by Hume. He writes: ''We have by daily experience clear evidence of motion produced by impulse and thought. But the manner how, hardly comes within our comprehension; we are equally at a loss in both. . . . For when the mind would look beyond those original ideas we have from sensation or reflection, and penetrate into their causes, and

[3] ''Essay on the Human Understanding,'' Bk. II., Ch. 25, Sec. 6.

[4] *Ibid.*, Ch. 21, Sec. 4.

manner of production, we find it discovers nothing but its own short-sightedness; . . . there is no more difficulty to conceive how a substance we know not, should by thought, set body in motion, than how a substance we know not, by impulse, set body in motion."[5] He thereupon concludes, that "powers are relations and not agents."[6] That is, "the changes which one body is apt to receive from or produce in other bodies upon due application" are of such a nature as to leave us in total darkness as to the manner of their production. What we have, therefore, in Locke is *a relation of objects, not of agents.* But not any object at random is capable of receiving or producing a change in another object; objects of a "due application" only have this capacity, or, as I prefer to express it, objects that are mutually *effective* and not such as are mutually *neutral* in respect to each other. This distinction is vital and I shall enlarge upon it later. For the present, the point I wish to enforce is that with Locke, as emphatically as with Hume, we are enjoined in the formulation of the causal situation not to transcend such data as are directly offered us in our sense perception, except possibly in the form of a working hypothesis.

Thus conceived, an investigation of the causal situation would resolve itself into the following parts: (1) an investigation into the nature and foundation of change in support of the distinction it establishes between a causal and a non-causal situation; and (2), an investigation into the elements (our related objects), in reference to which change is found to emerge and in reference to which change must be grounded and explained to the extent of its susceptibility to explanation.

A consideration of (1) and (2), however, will not fail to give proof of the presence of a thought-process. Hence, to ignore or deny the presence of a thought-process is apt to invite ambiguity and even failure. The following statements extracted from the articles in question intimate such ambiguity. "The main results of this investigation are, that there is a necessity in the existent world, and that it is not an absolute *a priori* necessity, but one *derived from* the existence of a dyadic relation."[7] That is, given "two terms in a certain relation . . . *the rest of necessity and by pure deduction* follows."[8] Or again: necessity is found "in the empirical contents of experience, rather than in the form imposed on it by mind."[9] I hold such statements in question if they intimate, as I fear, a failure to distinguish between an immediate perception that is ultimate with-

[5] *Ibid.*, Ch. 23, Secs. 28–29.

[6] *Ibid.*, Ch. 21, Sec. 19.

[7] This JOURNAL, Vol. XI., page 376.

[8] *Loc. cit.*, page 375. The italics are not mine.

[9] Page 375.

out mediation of any kind, and one that is immediate after a prior mediacy. That causation, in respect to the varied elements it combines—change among others—embodies such mediacy, requires no extended proof. I think we are safe in assuming, in the way of a proof, (*a*) that, without the emergence of change (a fact Professor Sheldon inclines to ignore) in one or more of the terms of the initial or dual situation, we have a non-causal and not a causal situation; and (*b*) that, without comparison and without data for a comparison, change for us can not even so much as emerge (appear). Such comparison demands that our original terms have each their more or less specific measure and boundary (a thing demanding thought), and, secondly, that the new element that appears in the form of change be a distinguishable element. If the "change" is not an element that is distinguishable, the presence of change is either not recognized, or, if recognized from one standpoint, is denied from another. Hence chemistry is disposed to deny *real* change in a mere mechanical mixture or composition. It is even disposed to deny a *real* change in a chemical mixture or composition, when compounds are held to as mere functions of its eighty or more elementary substances. But it does hold that a chemical change is more truly a change than a mechanical one. In all this, however, a thought-process operating under the control of certain principles is clearly evident. It is still further evident where our new element, the so-called change-datum, acquires the status of an adjective only or that of a substantive. Thus a general chemist regards water, vapor, and ice as mere adjectives of the so-called mass, H_2O; whereas the physical chemist regards them as substantive in character. Such differences, which are to be multiplied at will, are not without their foundation and special points of reference. The fact I seek to establish is that whether I assign the adjective or substantive status to the new change-datum as manifested in the original situation depends entirely upon the measure and boundary affixed to the dual or multiple objects prior to their entrance into a causal situation. If the change-datum is compatible with the measure and boundary of our original terms, then one or more of the original terms would appropriate it, and the element of change would appear as an adjective and not as a substantive. If, however, such change-datum is incompatible with the defined measure and boundary of the original terms, then it is that the change-datum emerges as a new *thing*. But decisions of this character clearly indicate the presence of a thought-process and a multiple of principles at every point.

So much taken for granted: let us now turn to Professor Sheldon's definition of causation. Each of the two types established by him "starts from a duality. . . . This is self-evident in the case of composition, where two factors plus the relation of combination deter-

mine unambiguously the resultant. In the case of the series, . . . two terms with a relation of sameness—and also of difference—between them determine unambiguously the remainder."[10] That is, "two terms plus the relation" determine the result. But if two terms *plus* the relation is one thing and two terms *minus* the relation another, by what mark or sign are we to tell when the required "relation" is present or absent? The phrase "plus the relation" presents itself as an addition to the two terms. But what is it? For unless it is at once real and distinctive, how am I to tell by an exclusive attention to a relation that it is present or absent; and, if present, that it is the relation of "combination" or "sameness" or some non-causal relation? Or is it not at all a matter of "relations," but a matter of "terms"? If so, will *any* two terms do? If not, "two terms" of what kind are required? Unless we can answer these questions, "plus the relation" remains a mere phrase. Locke has said as much and as little in his phrase that "powers are relations and not agents." For the question would persist: if the causal relation is real and distinctive, what is its nature and foundation? You can not find the required foundation or differentia in "sameness with a difference," for this principle of "sameness with a difference" is not and can not be restricted to the causal situation, inasmuch as it is vital to a thought-process in general.

Suppose, then, we follow Locke and identify our "relation" with a change-datum. In this case to say that the "relation" is present when our dual terms "combine" and absent when they do not thus combine (either mechanically or chemically) would suggest the solution, but the solution would be one that made *change* and not the *dual* terms the more ultimate element in the causal situation. Moreover, if he accepts this suggestion, the meaning of "relation" would convert itself into a matter of "terms"; for "change," in its status, is either an adjective or a substantive. A causal "relation," then, is as real and as distinctive as a *change* in the *terms*.[11] If so, what we ought to say is, that two or more terms

[10] *Loc. cit.*, page 371.

[11] It is in virtue of this fact that a causation of one order of existence distinguishes itself from another, whether that order be one that is bound up with physics, or with chemistry, ethics, esthetics, economics, etc. If, however, Professor Sheldon has come to mistake the types of causation identified with physics as exhaustive, this error would be explained in his failure to distinguish at the outset between a causal and a non-causal situation. Suppose we question whether his "two types of causation" are really valid forms of causation. Where would he turn for support in his position if not to the *elements* revealed in a prior distinction between a causal and a non-causal situation? In this way only can we tell whether physics has done full justice to the conception of causation or not. Hence a comparative method involving *all* the sciences is unavoidable to the investigation. And in this aim it is of special importance that

plus a change in them give us the causal situation; whereas two or more terms, not in this relation of change, give us a non-causal situation; and I stand ready to affirm that the causal relation as a "relation" can not otherwise be empirically defined. Not *any* "two terms," but two terms of a "due application" (to revert to Locke's phrase) embodies the differentia of a causation. But I fail to see how Professor Sheldon can define the causal relation by reference to change, unless his phrase,—"two terms plus the relation of combination or sameness unambiguously determine the result"—would read otherwise than it does read when transcribed in terms of *change;* namely, two terms *plus a change* determine a *change.* I would, however, be willing to discount this evident tautology if it were not that Professor Sheldon, according to my understanding of him, explicitly identified the causal situation, not with a cause-effect situation, but with the "cause" as divorced from the "effect" (I shall speak of this later). Hence, the cogency of the conclusion he is seen to draw; namely, two terms plus a relation given, "*the rest of necessity and by a pure deduction* follows."[12] But how we are to distinguish between a "change-datum" and an "effect," if "plus the relation" means *change* and the phrase, "the rest of necessity," etc., means the "effect"; or again, how Professor Sheldon is going to rescue the one or the other or both of these phrases, if this doubling up in *change* is denied, are matters that I find myself unable to grasp. Rather does this complication serve to convince me of my original conclusion, that the phrase "plus the relation" is devoid of any real import. For we do not proceed from a "relation" to "change," but we proceed from a "change" to the claim that such objects as involve a change indicate a dependence or connection—a relation—which neutral objects, by comparison, are seen to lack. As for the other phrase ("the rest of necessity and by pure deduction follows") Hume has long since administered the death-blow to its rationalistic implication. For with an emphasis upon change as something real, our "effect" not only becomes an inherent element of the causal situation, but, further, assumes the nature of an independent incommensurable. The principle of sameness to this extent obviously becomes inadequate to the full meaning of a *connection* in cause and effect. On the other hand, to deny a reality to "change" is to convert an apparent causal into a non-causal situation.

I agree with Professor Sheldon that we must assume two or more terms for our cause. But this, as we have seen, is not enough. We must further assume that objects are neutral or effective, partial

one should not mistake a particular *theoretical explanation* of causation for a direct investigation of *causation* in general. Professor Sheldon, I feel, did not escape this further error.

[12] *Loc. cit.,* page 375.

or indifferent in respect to each other. When neutral or indifferent objects are brought into conjunction, nothing follows, and our situation is a non-causal one. But where effective or partial objects are brought into conjunction, there a change-datum will appear, and our situation becomes one involving causality. In a word, causation finds its differentia in the fact that disconnections exist among objects as well as connections,—a fact which our inductive methods strikingly exemplify, although philosophy, in dealing with causation, with a possible exception in favor of Locke, has consistently and persistently ignored this distinction. Yet this distinction is so vital and far-reaching that I see in it little less than a revolution for metaphysics. But why certain objects in respect to others are either effective or neutral, that we can not tell. That they are effective or neutral is a matter of every-day and of scientific experience. But when, as Locke wrote, "we penetrate into their causes [as agents] and manner of production, we find our mind discovers nothing but its own short-sightedness." The assumption of neutral *versus* effective objects (and an object effective in one situation may be neutral in another, and *vice versa*) makes it possible to transcribe the odious, trans-empirical "power" into terms that are strictly empirical, and yet enables us thereby to retain the full scope of the rôle originally assigned to "powers."

Having once postulated the existence of effective and neutral objects, our next aim should be an investigation into the varied ways a given causal situation is handled by different men or sciences; for one might call that a change (hence a causal situation) which another might deny, as noted above in connection with chemistry. The same holds true in respect to the measure and boundary affixed to our objects. They are variously defined in virtue of varying principles which we either consciously or unconsciously adopt. Yet the specific conception of our objects is so important that, without it, the substantive or adjective status of our change-datum can never be determined. But in a preoccupation with principles so vast and varied, we drag in metaphysics by the wholesale. Mass, motion, space, conservation of energy, sense-perception, in mutual harmony or in opposition, are but a few of the many principles that would determine us in such decisions. Evident constructs, then, are present in any conception of the causal situation. Hence to speak of causation as found apart from "the form imposed on it by mind" seems to me not only a needless, vitiating restriction in our conception of the problem, but one that, in advance, precludes a full and complete analysis and estimate of its various parts.

A comparative method of the order suggested, then, such is my opinion, would aid us in more narrowly defining the elements pe-

culiar to the causal situation. Such a peculiar characteristic of the situation, I think, is to be found in the fact that the "effect" in respect to its "dual cause" embodies an "incommensurable element," even in those specific cases of a cause-effect series designated by chemistry as reversible. Such a reversible series is offered by "water" in respect to its origin from and return to H_2O. Yet water as water is as unique and as distinct a phenomenon as hydrogen or oxygen; *i. e.*, water is not wholly to be explained in terms of hydrogen and oxygen. Here lies the tantalizing enigma. Something inherently new has emerged, yet something can not come out of nothing. Nor can "agents" and "powers," in their odium, offer us any assistance. They help to indicate, however, as a matter of tradition, that the enigma is one that is inherently real. Yet Professor Sheldon seems to glide over it even in his causation of the type called "composition." Two terms with him "combine to produce a third in which they are preserved intact."[13] (Are hydrogen and oxygen, as hydrogen and oxygen, held intact in water)? "The first [the dual cause] is more fundamental than the second [the effect] *only* in the sense that the second is defined by reference to the first, but not conversely."[14] The reason he offers is that the cause and the effect are fundamentally identical except for their occurrence in a "time" that is "existential" and "irreversible." We therefore require a reference from effect to cause, and not the converse, he thinks, because "the past has a certain existential rank higher than that of the future."[15] Otherwise identical, the effect, it seems, would demand no explanation. It is wrong, then, he thinks, to speak of a cause as if it gives "rise to, or necessitates, or in any way accounts for, the effect."[16] Yet we *do* speak of the cause in the manner Professor Sheldon would here proscribe, and we do so for the reason that a given result in respect to its dual cause is an incommensurable, and because a given result is invariably bound up with one or another (not merely *any*) specific set of conditions. We do this because we think it pertinent to refer to the specific terms with which a given effect is commonly found associated; our sole alternative would be to refer to any term at random. And the need or necessity to refer to some term or other appears to be bound up with the fact that the effect is at once something new and incommensurable. If, accordingly, we did not seek to find its origin and explanation in this special reference, where are we to turn for its origin and explanation? Hume's insistence upon the incommensurable character of the effect is a matter of tradition. His exaggerations, no doubt,

[13] *Loc. cit.*, page 371.

[14] *Ibid.*

[15] *Loc. cit.*, page 372.

[16] *Loc. cit.*, page 371.

are susceptible to correction; but they are not susceptible to a reduction to a zero, without reducing the reality of causality itself, and every principle it leans upon for support, to a zero. Yet the only incommensurable element that Professor Sheldon appears to retain for an "effect" is an irreversible, existential time, with a "past" that is assumed to be of a higher rank than a "future."

The foundation of a causal *versus* a non-causal situation is one thing; an explanation of our "effect" as an event distinguishable from the dual terms of the "cause," another. The first, I think, is found in the distinction between terms as neutral and as effective; the second is found by a method of comparison involving qualitative and quantitative likenesses and differences. If an "existential time" presents itself as such an element, well and good. That "time," however, constitutes the *sole* difference. or that it constitutes the real distinction between a causal and a non-causal situation, are conclusions that I, for one, at least, could hardly accept. Nor would either chemistry or physics justify us in such a conclusion. In them, time constitutes but one possible element among other elements (as temperature, pressure, etc.) in a multiple cause as necessary to a certain result. But whatever the specific conditions of a given "effect," the effect would never acquire its distinctive character if it did not embody an incommensurable of some independence. Deny its incommensurable character and we may ask, why speak of a causation at all? I fear a too exclusive dependence upon physics in support of his explanation of the causal situation has reaped its penalty; for while the incommensurable element offers nothing that is peculiar or real in the causal situation of a science almost exclusively dependent upon the principle of conservation, this disposition of the incommensurable element, however far it may validly be carried in a certain directon, would still have such difficulties confronting it as sense-perception presents, whether or not such elements, from the standpoint of physics, are labeled as secondary or illusory.

The objections I have raised in connection with Professor Sheldon's postulate of "two terms" are, (1) that he neglects to distinguish and to give a foundation for "two terms" of a causal and "two terms" of a non-causal relation; (2) that his principle of "sameness" with a difference in an "existential time," fails to do justice to the conception of an effect as something independent (incommensurable) and as something dependent (upon a cause); and (3) that he fails to recognize the constructive process which any specific solution of the cause-effect relation necessitates and entails. It is in an estimate of the principles thus laid bare, however, that an exposition and a definition of causation are alone made possible.

I turn to a consideration of Professor Sheldon's next main

result. It relates to the subject of an existent necessity. He writes that "the main results of this [his] investigation are, that there is a necessity in the existent world, and that it is not an absolute *a priori* necessity, but one *derived from* the existence of a dyadic relation."[17] Had Hume, he thinks, "examined specific cases of causation, or had he even told us what necessary connection meant, the present almost universal philosophical skepticism in regard to its history might not have come into being. One great obstacle to his search was that he treated a cause as *one* instead of *two.*"[18]

Grant that Hume did not "tell us what necessary connection meant." What, then, *is* it for Professor Sheldon? The answer is, that necessity is a *connection* in cause and effect based upon sameness with a difference. The emphasis is upon sameness. Hume, I take it, reversed the terms thus emphasized and accordingly denied a connection. Professor Sheldon, however, not only affirms the reality of a connection, but affirms it to be one of the existent world. It is a thing, therefore, that is not to be imputed to a thought-process. But such a position is infected with what is overtly contradictory. For if it be true that sameness and difference are vital to the thought-process in general, the conclusion would seem to be that they are principles of thought rather than of things, although things may and do show themselves amenable to them. What I mean is, that a sameness or a difference that is vital from one standpoint in the determination of an object's specific measure and boundary may be negligible from another, and *vice versa.* Thus a Shakespeare and an idiot, a criminal and a saint may be fundamentally the same from one standpoint and fundamentally different from another. Yet Professor Sheldon deals with sameness and difference as if they were existential constants. Without pausing to discuss the issue, therefore, let us assume with Professor Sheldon that sameness and difference are existential constants in the full sense that his position demands. In that event it is necessary to ask, whether the cause-effect *duality* finds its reality in the fact of a difference? If so, what reality can we gather for the duality, if our difference (the incommensurable) is disposed of as approaching zero, except for an existential "time" with a past of a higher rank, as he assumes, than a future? On the other hand, what reality can we gather for *connection,* if based upon *sameness* and a fixed or variable scope is permitted to difference? Unless a scope is given to difference, the cause-effect *duality* vanishes; and if a scope be granted to difference, we to that degree diminish or neutralize our connection. The dilemma is a serious one. Professor Sheldon meets it by his assumption of an existential time.

[17] *Loc. cit.,* page 376.

[18] *Loc. cit.,* page 375.

Cause and effect appear at different intervals in time, and herein, he thinks, lies their sole difference. Thus he speaks of the effect as "another case" of the cause, although "another case" of it with a time difference. Sameness is still made to bear the burden of a causal connection,[19] in contrast with which, difference is made to carry no burden; and "that two terms can be the same while different does not seem contradictory"[20]—such is his version. But suppose we focus attention upon a causal *situation* and not upon a causal *connection.* In that event, would difference still be released of its share of burden? And if not (as I must affirm), how avoid neutralizing the *connection* that an affirmed *duality* in the cause-effect relation naturally entails? If, however, it be maintained that no difference between cause and effect exists except the one difference in "time," suppose we ask whether our "effect" also consists of *two* terms as Professor Sheldon claims for a "cause"? For if our cause is *two* and our effect *one,* how can the effect be "another case" of this cause, unless this particular "difference" (together with all other differences in our effect except that of time only) be one that is negligible? But if a duality of terms is a negligible difference in the effect, it must also be held to as a negligible difference in the cause. But it is not a negligible difference in the cause, as Professor Sheldon's indictment of Hume in the above extract emphatically proclaims. Then how can it be a negligible difference in an "effect" that is at bottom but "another case" of the "cause"? One can not thus blow hot and cold with the same "difference," especially when one is committed to the task of dealing with difference and sameness as if they were existential constants. Deny that they are existential constants, and our argument at once shifts to principles even more damaging to his position. For once admit that a sameness or a difference in objects is a variable, then a causation that is based upon a "sameness with a difference," where *sameness* bears the burden of *connection,* converts its supposed connection into a disconnection and its necessity into a sheer contingency, or the reverse.

Notwithstanding these difficulties and consequences as incident to his position within the range of his own argument, suppose we allow that sameness in cause and effect guarantees the connection between them and that a difference in time is all that Professor Sheldon says of it and that it is adequate to the full meaning of an "effect." In that case it still remains to ask whether or not I have an instance of causation when I clearly have recourse to "sameness" and "time" in considering objects of a purely static relation, as in the case of two successive, unconnected rain-drops falling from a roof or between two

[19] *Loc. cit.,* page 372.

[20] *Loc. cit.,* page 374.

unconnected rain-drops in juxtaposition on some leaf? If the crux of a causal situation for him is an existential time, why does not the time-interval of the falling drops suffice to convert them into a causal relation? Or if "two terms with a relation of sameness" yields a type of causation, why do we fail to have a causal situation with our *identical,* unconnected rain-drops? And this facilty of "sameness" and "time" to convert a causal into a non-causal relation, or the reverse, holds true apart from the flexibility the principle of "a sameness with a difference" acquires, as noted above, if denied the status of an existential constant.

I conclude that a connection in causation primarily based upon sameness or a disconnection in causation primarily based upon difference (Hume), fails to make good. It fails to make good for the reason that *the existence of a connection can be proved only by reference to its affirmed opposite—disconnection,* or the reverse. Without *change,* such a distinction fails to appear. Admit change to be *real,* and the difference between connection and disconnection is real. Deny change to be real, and the difference between connection and disconnection ceases to be real. Without the reality of a disconnection, however, the reality of connection has no import. For like "sameness" and "difference," connection and disconnection constitute terms that are correlative, and hence they either rise together or they fall together.

But what a "connection" has to do with a "necessity" (the next step in his argument), is not evident, unless such connection reflects itself as a principle of control in thinking or in the behavior of objects. Hence to prove an "existent necessity," demands that we show a fixed or regular behavior among objects uninfluenced by a thought-process. Now sameness in objects may embody a principle of such control in thinking, but in what its necessity may consist in the behavior (active relation) of objects, remains unillumined darkness for me in the exposition of causation under discussion.

"That there is a necessity in the existent world," however, I have come to take for granted; and in conclusion offer my reasons in support of the contention. In this I purpose a further independent contribution to the subject. (*a*) Mutually effective terms exist in contrast to terms that are mutually neutral. In the former case, *a* change appears, although *what* change remains *a priori* unknown. But the change, if the terms are mutually effective, *will* appear. The necessity works both ways. The change *will not* appear if our terms are mutually neutral. This is the first moment of a causal necessity as I have come to conceive it. (*b*) The second moment of a causal necessity presents itself in the fact that a given set of conditions *produces* but one given result; hence *any* terms taken at random

can not produce this specific result. (*c*) And the third moment of necessity is found in the fact that the *same* set of conditions will always have the *same* result. Hence we may conclude that *effective terms are bound up in a way of dependence and connection that neutral terms lack.* But what specific terms are bound up with what specific terms in this effective and in this neutral way, is, as I understand it, the aim of all science to discover.

Such "necessity," I hold, is of the "existent world"; but this existent necessity is not, of need, the only "necessity" present in an analysis of the causal situation. Other principles, abstract or what-not, as indicated above, enter and determine it as well. But with such corrections and suggestions as have been offered, I feel my reply to Professor Sheldon may be brought to a close.

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REVIEWS AND ABSTRACTS OF LITERATURE

Bergson and Romantic Evolutionism. Two Lectures Delivered before the Philosophical Union of the University of California. A. O. LOVEJOY. Berkeley: University of California Press. 1914. Pp. 61.

Studies in Bergson's Philosophy. ARTHUR MITCHELL. Bulletin of the University of Kansas. January 1, 1914. Pp. 115.

Both Professor Lovejoy and Professor Mitchell are manifestly and confessedly very much influenced by Bergson, but neither is willing to be regarded as a follower of that philosopher. Professor Mitchell undertakes a summary and a criticism of the principal aspects of Bergson's philosophy, and his studies are largely concerned in pointing out contradictions, although he concludes with a high expression of appreciation. Professor Lovejoy, on the other hand, while admitting many logical flaws in Bergson's notions of time, matter, and the like, is minded to dwell not on these, but rather on that which to him constitutes the French philosopher's chief significance,—to wit, "that he has revived this hypothesis of Romantic, activistic, or radical evolutionism."

This hypothesis Professor Lovejoy welcomes as taking the place of the mechanistic philosophy of nature which has been in alliance with thinking on evolution, and through it he hopes to see the intolerable "spectacle of a 'block-world'" exorcised. "Bergson," he continues "has presented to us the future of a world which is at bottom alive, in which in truth there is at every moment 'something doing' and something to do; in which there is a striving in progress which all *our* strivings help or hinder; in which, finally, the future contains the possibility of unimaginable fresh creations, of a real and cumulative enrichment of the sum of being." This concept of an evolution which is a real becoming Professor Lovejoy finds will lead on to a new philosophy of religion, inasmuch as it will give

rise to a new concept of the relation between temporal, fragmentary existence and the supreme reality, God. He analyzes the historic views regarding this relation into five, as follows: (1) God is a Being superior in power and moral attributes, but, nevertheless, temporal and not properly speaking omnipotent; One whom man can oppose and who will fight with man to bring about a better order. (2) God is self-sufficient reality, perfect and supra-temporal. The temporal world emanates from Him and constitutes an imperfect unreal revelation of Him, yearning to return to its source. (3) God is perfect, but this perfection includes the partial and the relative. He is supra-temporal, but His eternal nature includes and subordinates time and its events. (4) God is a perfect supra-temporal Being, but not the efficient Cause nor the all-inclusive Unity involving the temporal and imperfect. Rather He is a final Cause who draws all life toward Himself. Tending toward God is not a return, for the temporal did not emanate from, nor was it caused by, the Eternal. (5) According to *radical temporalism* or evolutionism, God is only a God in the making. He is the *élan vital* which works through us to ever higher realizations.

Toward this last philosophy of religion Professor Lovejoy inclines, and he regards it as a natural outcome of Bergson's "Creative Evolution." It would indeed seem as though the "Creative Evolution" left no place for a perfect God in the real universe of time. Difficult as it is for the understanding to grasp the notion of progress dominated by a God who is non-existent, one must yet admit the appealing quality of a view of religion that leaves man something real to do and something as yet undreamed of to achieve.

Professor Lovejoy's lectures are charmingly written and will afford not only to the expert, but also to the layman in philosophy, a very clear and entertaining account of Bergson's views on evolution.

Professor Mitchell holds that philosophy is essentially a matter of reflection and that, in consequence, a philosophy based on intuition or immediate experience, is bound to be at last a contradiction. The contradictory positions into which Bergson's intuitionism leads him are displayed at length. Matter is at times ruled out of reality by Bergson, while again it is held to be only another type of the real known by the intellect; the abstract is inveighed against in favor of the reality of the thing, yet there is a "reification" of the abstract in the denial of the validity of any but immediate knowledge; quantity is denied to consciousness, yet at times quantitative predicates are subtly applied thereto, and so on. "A deep temperamental abhorrence of determinateness" seems to Professor Mitchell to be the dominent motive in Bergson and to preclude him formulating a definite philosophy. Notwithstanding this, our author declares Bergson to be preëminent among those who express our *Zeitgeist* in a demand for complete experience and in affirming "in theory the possibilities of an intense instinctive living as an answer to the riddle of the universe."

Bergson might well say of these two recent critics that, while he has offended their intellects, yet their intuition seems to have found in the

apparent contradictions of his pure duration and his creative evolution a fascinating reality.

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Die Religion der Griechen. ERNST SAMTER. Leipzig and Berlin: B. G. Teubner, 1914. Pp. 86 + 16.

This booklet, belonging to the series "Aus Natur und Geisteswelt," does excellently in brief compass what it proposes, to wit, to offer a short survey of Hellenic religion. Its title, I fear, is calculated to mislead the reader, who should be warned that our author does not offer a sketch of Hellenistic religion, a theme to which, as is proper, a separate volume of the series is to be devoted.

Dr. Samter's account is on the whole what one has a right to expect of a brief summary. Its limits preclude completeness and enforce a practise of selection of typical and important matters treated with sufficient fulness to avoid the appearance of a catalogue and with due regard to views generally accepted, because argument is out of place and novel views should not be put forth without full evidence. There are naturally many points about which scholars would differ, but they are minor and incidental. Thus the statement (p. 24) that the cult of Demeter originated in Thessaly, and (p. 28) that in Plato's "Apology" the judges in the under-world are represented as settling quarrels there rather than as sitting in judgment on the past lives of souls that descend to them, are both open to serious question. In the effort to distinguish between the religion of the common folk and that of the enlightened, whether artists or philosophers, Dr. Samter incurs the inevitable risk which besets any one who is compelled, as the historian always is, to take account of the spirit as well as the form in religion, with scarcely a hint as to the former except in the writings of the great leaders of thought. One may well question whether the common folk could rise to such heights as Æschylus, Pindar, and Plato, but how can one know what passed in the minds of the multitude when they performed their simple rites? The fairest dreams of the prophet grow out of the daily life of his people, and many an unheralded soul has seen visions and dreamed dreams. No historian can afford to ignore the mute aspirations and inspirations of the throng.

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La Conscience Morbide: Essai de Psycho-pathologie Générale. CHARLES BLONDEL. Paris: Felix Alcan. 1914. Pp. ii + 336.

In the first two fifths of the book the author gives analyses of seven cases which lead to the formation of a new hypothesis regarding morbid consciousness. Morbid consciousness is largely cœnesthetic instability, it is a rebel to logic, and refractory to our conceptual régime; it differs essentially from the normal consciousness and is *sui generis.* Of the difference between the normal and the morbid consciousnesses the morbid individuals are incapable of giving us information, "since their conduct

and language are in large part unintelligible to us." The normal consciousness, we are told, is fragmentary and distributed and is only an abstraction of the (suppositious) continuum upon which it depends (p. 271). Both the normal and the morbid have the same intensity, value, and activity, but the practical results of the two kinds of consciousness differ in that the normal consciousness " is capable of that conceptual distribution and organization, which collectivity, intelligence, and language . . . have adapted to the objective conditions of our existence among men and things." The case histories are worthy of study.

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WASHINGTON, D. C.

JOURNALS AND NEW BOOKS.

REVUE PHILOSOPHIQUE. July, 1914. *Antour du Sens Musculaire* (pp. 1–39): J. PHILIPPE. – A suggestive study based on the introspective accounts of athletes, who are obliged to keep their motile sensations free from other sensuous admixture, while the accuracy of their sensations may be objectively controlled. Its conclusions bear on the formation and education of motile sensations, their various types, and their relation to types of motion. An essential factor in the translation of the idea of motion into action is the precision of the motile sensations, which must be adapted to the end in view. These sensations seem to " vanish in the measure in which the realized movement approaches its perfect form." There is some evidence for the existence of *sui generis* motile images. *Programme d'une Esthétique Sociologique* (pp. 40–51): CH. LALO. – " The normative science of art," esthetics, presupposes certain social conditions, of both esthetic and non-esthetic order, which alone render artistic judgment concrete. "Esthetic value . . . is a social fact. . . . A work is considered ideal when we suppose that it corresponds to the normal condition of a future technique." All art has a social function, namely, " the discipline of *luxe*," which, left to itself, is anti-social. *Grâce et Foie* (pp. 52–70): G. TRUC. – The Catholic definition of belief implies a dispensation of divine grace, which quickens the dogma by inducing a state of assentive feeling in the believer. From the psychological point of view this emotive and intuitional state may be characterized as a spontaneous organization and synthetic harmony of feelings previously latent or subconscious. *Revue Critique: La Psychologie des Phénomènes Religieux d'après Leuba* (pp. 71–79): G. BELOT. – A favorable review which in certain points completes Leuba's ideas. The reviewer takes exception to Leuba's conclusions as to the future of religion, which do not agree with the author's own definition of religious activity, and points out the necessity of a sociological inquiry to supplement the psychological. *Analyses et Comptes Rendus.* Ingenieros, *Principes de Psychologie Biologique:* TH. RIBOT. Hans Vaihinger, *Die Philosophie des Als Ob:* M. SOLOVINE. Ch. Fiessinger, *La Formation des Caractères:* FR. PAULHAN. H. Le Savoureux, *Le Spleen:*

L. DUGAS. Arnold Pick, *Die Agrammatischen Sprachstörungen:* PH. CHASLIN. Maurice Halbwachs, *Quetelet et la Statistique Morale:* JANKÉLÉVITCH. Eugène Lévy, *L'Évangile de la Raison. Le Problème Biologique:* JANKÉLÉVITCH. George Chatterton-Hill, *The Sociological Value of Christianity:* G. RICHARD. *Fausto Squillace. La Moda:* J. PÉRÈS. *Revue des Périodiques Étrangers.*

Jevons, F. B. Philosophy: What Is It? Cambridge: University Press. New York: G. P. Putnam's Sons. 1914. Pp. v + 172. $1.00.

Ladd, George Trumbull. What Can I Know? New York: Longmans, Green and Company. 1914. Pp. viii + 311. $1.50.

Martin, Otto. Zur Psychologie des Verstehens Wissenschaftlicher Texte. Freiburg im Breisgau: Hof- und Universitätsbuchdruckerei C. A. Wagner. 1914. Pp. 188.

Ogden, Robert Morris. An Introduction to General Psychology. New York: Longmans, Green and Company. 1914. Pp. xviii + 270. $1.25.

Schiller, F. C. S. Philosophy, Science, and Psychical Research. Proceedings of the Society for Psychical Research. Part LXIX. Vol. XXVII.

NOTES AND NEWS

HENRI LICHTENBERGER, now French Exchange Professor at Harvard from the Sorbonne, is an Alsatian, having been born in Strasbourg in 1864. His native tongue, therefore, is French, though he learned German very early while attending the German *Gymnasium*. His family, as so many of that region, soon after the war decided to leave that unfortunate province, and went to Paris in 1876 where, shortly afterwards, Henri Lichtenberger took the regular courses at the Lycée, and was from that admitted to the Sorbonne. Having at this time chosen as his special field the study of Germanic thought and literature, he returned to Alsace and studied at the University of Strasbourg from 1884 to 1887. As soon as he had completed his studies Mr. Lichtenberger was appointed professor at Nancy. Here he remained until 1905, when his writings and renown secured him a professorship at the greatest of French universities, the Sorbonne, where he has taught ever since. Mr. Lichtenberger's name is probably more closely associated with the modern philosophy than with the literature of Germany. In fact he found himself at an early age very much attracted by the teachings of Nietzsche, whom he has since made his special subject. Indeed it can be said that he was actually the first scholar to discover Nietzsche, and to realize the importance of this new thinker, whom he has explained and interpreted, according to the judgment of Nietzsche's closest friends and disciples, better than any one else. The writings of Professor Lichtenberger are many and their variety shows a remarkable breadth of learning, ranging from studies of medieval legendary lore to modern philology, from the appreciation of romantic

poetry and music to the history of contemporary German civilization. The following list will give an idea of the labors of this French scholar: 1891—"Légendes des Niebelungen"; 1895—"Histoire de la Langue Allemande"; 1898—"La Philosophie de Nietzsche"; 1898—"Wagner, Poète et Penseur"; 1905—"Henri Heine, Penseur"; 1907—"L'Allemagne Moderne et son Évolution"; 1912—"Novalis." During his stay at Harvard Professor Lichtenberger is giving two courses, one on Nietzsche and the other on "Renan et le Nihilisme Intellectuel Contemporain." The former is open to the public.

WITH the appearance of its October number the *Mid West Quarterly* begins its second year of publication. It may be said without affectation that it has been a means of communication between the universities and the thinking public from which communication both factors ought to benefit. It was established that serious literature might find a journal, serious literature which is not the expression of minute research nor over-detailed speculation. It is rather a magazine of cultural opinion; its articles have ranged from logic to history. The man who is not a professional schoolman, but who, nevertheless, does not deem himself thereby excluded from thought ought to find in its pages a continuous stimulation. So too ought the university man, who is in greater danger of losing his soul, to find a constant reminder that he is really living in a society and in a society with more than one interest. This satisfying of a diversity of interests will make the *Mid West Quarterly* distinguished among its fellows which restrain themselves by defined programmes. It is not held to one kind of opinion nor to one kind of expression. The radical as well as the reactionary is welcome to its pages. By some readers this will be thought a lack of "editorial policy," by others it will be thought the perfection of editorial policy. However one looks at it, he can not fail to sympathize with any effort to fit the university into life, and if the *Quarterly* does that alone, it will have accomplished a great deal.

ON October 19, Dr. C. E. Ferree, of Bryn Mawr College, gave a lecture before the Section of Astronomy, Physics, and Chemistry of the New York Academy of Sciences on the Efficiency of the Eye under Different Conditions of Lighting.

FREDERICK G. HENKE, PH.D., Chicago, professor of philosophy and education in Willamette University, Salem, Oregon, has been appointed acting professor of philosophy in Allegheny College.

AT Oberlin College, Dr. George R. Wells has been promoted to an associate professorship in psychology and Dr. E. M. Kitch has been appointed associate professor of philosophy.

THE Congress of Neurologie and Psychologie, which was to have convened in Berne on September 7, has been indefinitely postponed.

J. CROSBY CHAPMAN, PHD., Columbia, has been elected assistant professor of experimental education at Western Reserve University.